

BEST AVAILABLE COPYPATENT
Atty. Dkt. No. AMAT/4778/DSMLOW K/JW**REMARKS**

This is intended as a full and complete response to the Final Office Action dated October 1, 2003, having a shortened statutory period for response set to expire on January 1, 2004. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1, 4-24 and 74-109 are pending in the application. Claims 1, 4-24 and 74-109 are rejected.

Claims 1, 4-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication No. 20020068458A1 (*Chiang*), in view of U.S. Patent Publication No. 20020081855 (*Jiang*). The Examiner states that *Chiang* describes a method of thin film deposition for integrated circuit fabrication comprising providing a substrate and treating the substrate with a plasma prior to forming an organosilicate layer. The Examiner further states that *Jiang*, at least in paragraph 13, teaches that the H₂O₂ plasma chemistry is an equivalent plasma chemistry known in the art and wherein the plasma is generated in a reaction chamber by applying an electric field to a gas mixture comprising molecular oxygen (O₂) and molecular hydrogen (H₂). The Examiner asserts that it would have been obvious for one of the ordinary skill in the arts at the time of the invention to substitute *Jiang's* method of the H₂O₂ plasma chemistry and wherein the plasma is generated in a reaction chamber by applying an electric field to a gas mixture comprising molecular oxygen (O₂) and molecular hydrogen (H₂) for *Chiang's* process steps to reduce or eliminate the resist poisoning. Applicant respectfully traverses the rejection.

Chiang discloses a method to perform an in-situ clean/surface treatment to a surface prior to an ALD deposition. *Chiang* discloses the use of atomic hydrogen or halogen-containing radicals to react with the surface contaminants, such as oxides to form oxygen containing byproducts, which are then easily pumped away (paragraph 25). *Jiang* discloses the use of an oxygen (O₂) plasma to reduce or eliminate the poisoning of resist. *Jiang* further discloses alternative plasma chemistries may be used, such as H₂, H₂O, H₂O₂, O₃, CO, CO₂, SO₂, etc. with or without gas additive like Ar or He (paragraph 13). *Jiang* does not teach that generating a plasma from H₂O₂ or H₂O is an equivalent known in the art to generating plasma from a gas mixture comprising

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molecular oxygen (O₂) and molecular hydrogen (H₂). *Jiang* teaches forming a plasma by the use of O₂, O₃, H₂, H₂O₂ or H₂O amongst others and never in combination. Therefore, *Chiang* and *Jiang*, alone or in combination, do not teach, show or suggest a method of thin film deposition for integrated circuit fabrication comprising providing a substrate, treating the substrate with a plasma prior to forming a organosilicate layer, wherein the plasma is generated in a reaction chamber by applying an electric field to a gas mixture comprising molecular oxygen (O₂) and molecular hydrogen (H₂) forming the organosilicate layer on the substrate and treating the organosilicate layer with the plasma, as recited in claim 1, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 11-24 and 74-109 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Chiang* and *Jiang*, as applied to claims 1, 4-10 above, further in view of U.S. Patent Publication No. 20020142579A1 (*Vincent*). The Examiner states *Chiang* and *Jiang* do not describe, yet *Vincent* does describe that the second gas mixture comprises a silicon source, a carbon source and an oxygen source and applying an electric field to that second gas mixture in the deposition chamber forms the carbon-containing silicate layer on the substrate. The Examiner asserts that it would have been obvious to one of ordinary skill in the art at the time of the invention to include *Vincent's* steps of the second gas mixture with the process derived by combining *Chiang* and *Jiang* as discussed above. Applicant respectfully traverses the rejection.

Vincent discloses forming low dielectric constant interlayer materials by use of organosilicon precursors. The combined references do not suggest applying an electric field to a mixture of molecular oxygen (O₂) and molecular hydrogen (H₂) since *Vincent* adds nothing to the other references which are discussed above. Therefore, *Vincent*, *Chiang* and *Jiang*, alone or in combination, do not teach, show or suggest a method of thin film deposition of an organosilicate layer comprising positioning a substrate in a deposition chamber, providing a gas mixture to the deposition chamber, wherein the gas mixture comprises a silicon source, a carbon source and an oxygen source, applying an electric field to the gas mixture in the deposition chamber to form the organosilicate layer on the substrate and treating the organosilicate layer with a plasma, wherein the plasma is generated by applying a second electric field to a second gas

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mixture comprising molecular oxygen gas and molecular hydrogen gas, as recited in claim 74, and claims dependent thereon. Withdrawal of the rejection is respectfully requested. Also, *Vincent, Chiang and Jiang*, alone or in combination, do not teach, show or suggest a method of thin film deposition of an organosilicate layer comprising positioning a substrate in a deposition chamber, depositing the organosilicate layer from a gas mixture, wherein the gas mixture comprises a silicon source, a carbon source and an oxygen source and treating the organosilicate layer with a plasma, wherein the plasma is generated by applying an electric field to a second gas mixture comprising molecular oxygen gas and molecular hydrogen gas, as recited in claim 96, and claims dependent thereon. Applicant further traverses the rejection of dependent claims 11-24 on the grounds stated above. Withdrawal of the rejection is respectfully requested.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show or suggest the invention as claimed.

Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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